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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/664,214	09/17/2003	Vincent P. Marzen	02CR305/KE	3359

7590 04/04/2006

Attention: Kyle Eppele
ROCKWELL COLLINS, INC.
400 Collins Rd. NE
Cedar Rapids, IA 52498

EXAMINER	
NGUYEN, KEVIN M	
ART UNIT	**PAPER NUMBER**
2629	

DATE MAILED: 04/04/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/664,214	MARZEN ET AL.	
	Examiner	Art Unit	
	Kevin M. Nguyen	2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 September 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 September 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-5 and 11-14 are rejected under 35 U.S.C. 102(e) as being anticipated by Toda (US 6,590,569).

3. As to claim 1, Toda teaches a touch screen display apparatus (an ultrasonic touch-position sensing device, see the Title), comprising:

a liquid crystal panel [a liquid crystal 2, Fig. 3] having a viewing area [a surface of a touch panel of a nonpiezoelectric plate 1, Fig. 1], with a periphery [four edges, Fig. 4, col. 4, lines 15-29];

a plurality of shockwave detectors disposed about said periphery [a plurality of acoustic wave transmitters Tx1 to Tx5, Ty1 to Ty5, and acoustic wave receivers Gx1 to Gx5, Gy1 to Gy5, arranged about said four edges, Figs. 1 and 4, col. 2, line 66 through col. 3, line 1 and col. 4, lines 16-19. It is noted that shock waves are equivalent to acoustic waves, see http://www.aerodyn.org/HighSpeed/waves.html];

said plurality of shockwave detectors [the plurality of acoustic wave transmitters Tx1 to Tx5, Ty1 to Ty5, and acoustic wave receivers Gx1 to Gx5, Gy1 to Gy5] configured to use a time of arrival [the acoustic wave (SAW),e.g., the Raleigh wave, travels in propagation per time, see Fig. 6, col. 7, lines 18-25] of a shockwave [an acoustic wave, col. 2, line 66-67] to determine a point of original [a cross point of the touch] of the shockwave in the liquid crystal panel which results from a touch occurring at said point of origin [see col. 6, lines 19-61].

4. As to claim 2, Toda teaches wherein said periphery is free from a plurality of pairs of opposing transmitters and receivers disposed about said periphery where said plurality of pairs of opposing transmitters and receivers are configured to detect a presence of an object disposed on the viewing area and between said transmitters and said receivers [the plurality of acoustic wave transmitters Tx1 to Tx5, Ty1 to Ty5, and acoustic wave receivers Gx1 to Gx5, Gy1 to Gy5 are arranged surrounding the four edges of the touch panel, Figs. 1 and 4, col. 4, lines 35-54, col. 2, line 66 through col. 3, line 1 and col. 4, lines 16-19];

5. As to claim 3, Toda teaches wherein said viewing area [the surface of the touch-plate 1, Fig. 1] is free from an electrically conductive transparent layer [non piezoelectric plates 1 and 3 are made of a transparent glass plate, col. 4, lines 8-9] and free from a connection to an electronic detection means [a signal analyzer 4, Fig. 4] which is configured to detect touching [col. 6, lines 52-61].

6. As to claim 4, Toda further teaches comprising a first array of shockwave detectors [a plurality of transmitters of acoustic waves Tx1 to Tx5, Ty1 to Ty5, Fig. 4,

col. 4, lines 16-19], disposed along a horizontal edge [Tx1 to Tx5 comprise a x-axis which is a horizontal edge, Fig. 1], which define a plurality of columns across said viewing area [it is noted that Tx1 to Tx5 transmitted a plurality of acoustic waves across in column];

a second array of shockwave detectors [a plurality of transmitters of acoustic waves Ty1 to Ty5, Fig. 4, col. 4, lines 16-19], disposed along a vertical edge [Ty comprises a y-axis which is a vertical edge, Fig. 1], which defines a plurality of rows across said viewing area [it is noted that Ty1 to Ty5 transmitted a plurality of acoustic waves across in row].

7. As to claim 5, Toda further teaches comprising a third array of shockwave detectors [a plurality of receivers of acoustic waves Gx1 to Gx5, Fig. 1] opposite said first array of shockwave detectors and a fourth array of shockwave detectors [a plurality of receivers of acoustic waves Gy1 to Gy5, Fig. 1] opposite the second array of shockwave detectors.

8. As to claim 11, Toda teaches a method of detecting a touch on a viewing panel of a liquid crystal display, comprising the steps of:

providing a display panel [a touch display panel] comprising a liquid crystal material [providing liquid crystal 2, Fig. 3], said display having a viewing area [a surface of a nonpiezoelectric plate 1, Fig. 1];

tapping a first location on said viewing area and thereby generating a shockwave as a result of such tapping [touching a cross point on the surface of a nonpiezoelectric plate 1, fig. 3];

providing a plurality of shockwave detectors which are not located at a single location [providing a plurality of acoustic wave transmitters Tx1 to Tx5, Ty1 to Ty5, and acoustic wave receivers Gx1 to Gx5, Gy1 to Gy5, Fig.4, col. 2, line 66 through col. 3, line 1 and col. 4, lines 16-19. It is noted that shock waves are equivalent to acoustic waves, see http://www.aerodyn.org/HighSpeed/waves.html];

detecting an arrival of said shockwave at each of said plurality of shockwave detectors [detecting the propagation of the acoustic wave by the acoustic wave detectors Tx,Ty,Gx,Gy, Fig. 6, col. 7, lines 21-22];

determining a time of arrival of said shockwave at each of said plurality of shockwave detectors [detecting the acoustic wave (SAW),e.g., the Raleigh wave traveling in propagation per time by the acoustic wave detectors Tx,Ty,Gx,Gy, see Fig. 6, col. 7, lines 18-25];

locating said first location in response to said step of determining a time of arrival of said shockwave [locating the cross point in response to the propagation of the acoustic wave (SAW) in time by detecting of transmitters Tx,Ty and receivers Gx,Gy, Fig. 6, col. 7, lines 18-25].

9. As to claim 12, Toda teaches wherein said relative time of arrival is based upon a plurality of times of arrival of said shockwave at a plurality of shockwave detectors [the velocity of the acoustic wave (SAW) is the distance traveled per unit time or the times of arrival].

10. As to claim 13, Toda teaches wherein said step of detecting an arrival of said shockwave comprises the steps of detecting a change in a predetermined electrical

characteristic of said liquid crystal material in response to a presence of said shockwave [detecting the touch cross point on the touch LCD panel (2) for exciting an ultrasound directly on a transparent nonpiezoelectric plate in contact with a liquid crystal (2), Fig. 3, col. 4, lines 55-63].

11. As to claim 14, Toda teaches wherein said step of detecting an arrival of said shockwave comprises the steps of detecting a change in a predetermined optical characteristic of said liquid crystal material in response to a presence of said shockwave [the LCD (2) is an electro-optical device; therefore, the surface acoustic wave (SAW) detectors are on the surface of LCD (2), and SAW detects a change in a predetermined optical characteristic of said liquid crystal material (2), Fig. 3, col. 4, lines 55-63].

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

13. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Toda in view of Umemoto et al (Us 6,891,530) hereinafter Umemoto.

14. As to claim 6, Toda teaches all of the claimed limitation, except wherein said liquid crystal panel is a multi-domain vertically aligned liquid crystal cell.

However, Umemoto teaches a related touch panel comprising a reflected liquid crystal panel 70 and a liquid crystal cell/molecules 54 [see Fig. 1 and 4, col. 15, lines 30-47] is a multi-domain vertically aligned cell [see col. 15, lines 48-55].

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to substitute the liquid crystal layer of Toda with the liquid crystal layer including the liquid crystal molecules vertically aligned cell as taught by Umemoto in order to achieve the benefit of providing a touch-input type reflective liquid-crystal display device bright, easy to view and excellent in low electric power consumptions (see Umemoto, col. 15, lines 5-7).

15. As to claim 7, Toda further teaches comprising means for determining a location [the cross point] of a tactile interaction [the sense of touch] on said viewing area by analyzing a time of arrival difference of a shockwave, due to said tactile interaction, on at least tow non-co-located points [touching a cross point of the first SAW lane is different touching a cross point of the second SAW lane, see col. 6, lines 19-45].

16. Claims 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Toda in view of Umemoto as applied to claim 1 above, and further in view of Duwaer (US 5,402151).

17. As to claim 8, the combination of Toda and Umemoto teaches all of the claimed limitation, except for an active thin film transistor layer in said liquid crystal panel, wherein said first array of shockwave detectors is integrated into said thin film transistor layer.

However, Fig. 4 of Duwaer teaches a related touch screen LCD 14 which includes a thin film transistor layer underneath comprising four elastic devices 104, 106, 108 and 110, each elastic device 104-110 comprises a train gauge (col. 8, lines 52-56);

digitizing tablet 12 and touch screen 10 include surface acoustic waves (SAW) both have been integrated on LCD 14 (col. 8, lines 31-34).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to implement the thin film transistor layer underneath the LCD panel as taught by Duwaer in the combination of Toda and Umemoto in order to achieve the benefit of providing a minimum parallax which can be attained owing to the highly compact structure, while fabricating the touch panel at low cost and light weight (Duwaer, col. 9, lines 61-64).

18. As to claim 9, Duwaer teaches wherein said first array of shockwave detectors (the SAW) is configured to detect a change of capacitance of said liquid crystal material in response to presence of a shockwave [electronic circuitry is provided for detecting a capacitive coupling from sheet 10 and 12 towards earth via finger 130 and for thereupon deriving the finger's 130 position, Fig. 5, col. 9, lines 13-16].

19. As to claim 10, Duwaer teaches wherein said first array of shockwave detectors (the SAW) is configured to detect a change of resistance of said liquid crystal material in response to presence of a shockwave [the homogeneous electrically resistive sheet 10 and 12 plays a part in both digitizing tabled 12 and touch screen 10, col. 9, lines 9-11].

20. Claims 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Toda in view of Devige et al (US 6,933,930) hereinafter Devige.

21. As to claim 15, Toda teaches all of the claimed limitation, except wherein said step of locating said first location comprises using a triangulation computation.

However, Devige teaches the coordinates touch input device which includes a configuration with three sensors PZT00, PZT10, PZT11 for detecting trio/triangulation of the touch location of the stylus on the touch surface (see Fig. 8, col. 10, lines 4-20).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to implement the trio/triangulation computation as taught by Devige in the ultrasonic touch-position sensing device of Toda in order to achieve the benefit of providing the accuracy of the measurement of the touch location of the stylus on the touch surface (Devige, col. 10, lines 1-3).

22. As to claim 16, Devige teaches wherein said step of locating said first location comprises a determination of a row and a column [if it is found that the uncertainty in the position of the impact remain less than 7 mm^2 in the (1,0) quadrant (fig. 8), then the touch cross point is determined by coordinates x (row) and y (column), see col. 10, lines 12-20].

23. As to independent claim 17, Toda teaches an apparatus for detecting a tactile stimuli upon a viewing area of a liquid crystal display (an ultrasonic touch-position sensing device, see the Title), comprising:

a liquid crystal panel [a liquid crystal 2, Fig. 3] having a viewing area [a surface of a nonpiezoelectric plate 1, Fig. 1], with a periphery [four edges, Fig. 4, col. 4, lines 15-29];

a plurality of shockwave detectors disposed about said periphery of said viewing surface [a plurality of acoustic wave transmitters Tx1 to Tx5, Ty1 to Ty5, and acoustic wave receivers Gx1 to Gx5, Gy1 to Gy5, arranged about said four edges, Figs. 1 and 4,

col. 2, line 66 through col. 3, line 1 and col. 4, lines 16-19. It is noted that shock waves are equivalent to acoustic waves, see http://www.aerodyn.org/HighSpeed/waves.html];

means for performing a computation to determine a location of a point of tactile stimulation on said viewing surface [if a touching a cross point is detected, see col. 6, lines 19-31], said means for performing being responsive to signals representative of a detection of a shockwave by said plurality of detectors [see col. 6, lines 19-61].

Accordingly, Toda teaches all of the claimed limitation, except for a triangulation computation.

However, Devige teaches the touch coordinates input device which includes a configuration with three sensors PZT00, PZT10, PZT11 for detecting trio/triangulation of the touch location of the stylus on the touch surface (see Fig. 8, col. 10, lines 4-20).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to implement the trio/triangulation computation as taught by Devige in the ultrasonic touch-position sensing device of Toda in order to achieve the benefit of providing the accuracy of the measurement of the touch location of the stylus on the touch surface (Devige, col. 10, lines 1-3).

24. Claims 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Toda in view of Devige as applied to claim 17 above, and further in view of Wilson et al (US 6,504,530) hereinafter Wilson.

25. As to claim 18, the combination of Toda and Devige teaches all of the claimed limitation, except wherein said plurality of shockwave detectors comprises a plurality of optical sensors disposed on a layer having thin film transistors thereon, where said

plurality of optical sensors measures an optical characteristic of a segment of said liquid crystal material.

However, Wilson teaches a touchscreen system which includes acoustic wave sensors comprising optical sensors 1307 and 1309 disposed on a liquid crystal layer 1301 and a pair of PVDF thin film piezoelectric strain gauges (Fig. 13, col. 10, lines 18-24, and col. 9, line 66 to col. 10, lines 6), the optical sensor 1307 and 1309 must continue to scan the IR beam across the active touch region in order to respond to a touch (col. 10, lines 57-59).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to implement the optical sensors as taught by Wilson in the combination of Toda and Devige in order to achieve the benefit of this approach is that a false touch, for example due to an article of the user's clothing resting on the touchscreen, will not be reported to the host system as a valid touch (Wilson, col. 9, lines 17-20), while minimizing the system power usage (Wilson, col. 10, lines 50-54).

26. As to claim 19, Wilson teaches wherein said optical characteristic is a brightness of light reflection [reflective grids 705, fig. 7] of a surface on an opposite side of said liquid crystal material from said layer [col. 7, lines 48-58].

27. As to claim 20, Devige teaches wherein said means for performing a triangulation computation determines a relative time of arrival of a shockwave at said plurality of shockwave detectors [the touch coordinates input device which includes a configuration with three sensors PZT00, PZT10, PZT11 for detecting trio of the touch location of the stylus on the touch surface, see Fig. 8, col. 10, lines 4-20].

Conclusion

28. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KEVIN M. NGUYEN whose telephone number is 571-272-7697. The examiner can normally be reached on MON-THU from 8:00-6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, a supervisor RICHARD A. HJERPE can be reached on 571-272-7691. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8000.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the Patent Application Information Retrieval system, see http://portal.uspto.gov/external/portal/pair. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kevin M. Nguyen
Patent Examiner
Art Unit 2629

KMN
March 30, 2006